**7th Grade Science**

**Unit 1: Forces and Motion**

**2016-17**

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| ***Standards*** | **Category Percent** |
| **Physical Science** |  |
| 7.P.1 | 13% to 17% |
| 7.P.2 | 18 % to 24% |
| **Earth Science** |  |
| 7.E.1 | 20% to 28% |
| **Life Science** |  |
| 7.L.1 | 16% to 22% |
| 7.L.2 | 8% to 14% |

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| **Subject:** Science  **Grade Level/Course:** 7th grade  **Unit Title:** Forces and Motion | | **Timeframe Needed for Completion:** | |
| **Big Idea/Theme: Work through forces and motion and understand that forces cause motion. Make predictions based on a given force.**  **Learning Targets:**   * Compare and contrast balanced and unbalanced forces. * Describe how friction affects the movement of an object. * Understand and restate the concepts stated in Newton’s laws of motion. * Generate hypotheses on the relationship between the amount of roughness and the amount of friction on a rolling object. * Demonstrate the effects of Newton’s 3 laws of motion in a lab setting. * Collect and organize data to show how the motion of an object changes in position over a period of time. * Explain how forces acting on an object affect the object’s motion. * Design an experiment that exemplifies the concept of speed, using scientific thought and collect and record the data from their experiment. * Interpret graphs to understand the data collected and recorded by other individuals. * Define mechanical energy as the energy possessed by an object due to its motion or its stored energy of position. * Recognize that mechanical energy is required in order for an object to do work. * Distinguish the difference between potential and kinetic energy as it relates to an object’s motion. * Recognize that all Earth and life processes require energy. * Define forms of energy, such as solar, biological, chemical, electrical, mechanical, light etc. * Distinguish between types of energy, such as solar, biological, chemical, electrical, mechanical, light etc. * Recognize that all objects have energy in relation to their position (potential). * Recognize gravitational potential energy. * Identify instances of energy transformation within processes in which energy is transferred. * Understand that energy is neither created nor destroyed (lost) when used within or between systems, although some energy is converted to heat. * Map the path that energy must take to turn on a light bulb. * Exemplify how an electrical current stops (or is interrupted) when a circuit is left open. * Understand that a machine is a device that makes work easier by changing the size of the force or the direction in which the force is applied. * Identify the six simple machines and give real world examples. * Explain the function of each type of machine. * Define work as a force applied to an object that causes it to move using the formula *Work = Force X Distance.* * Identify the unit of measure for work as the Joule using the formula *Joule=Newton X meter* * Explain that mechanical advantage is the number of times a machine multiples the force exerted upon an object. * Understand that Ideal Efficiency of a machine is 100% and that the more efficient a machine is, the higher the percent of efficiency it will have. | | | |
| **Curriculum Goals/Objectives:**  7.P.1 Understand motion, the effects of forces on motion and the graphical representations of motion.   * + 7.P.1.1 Explain how the motion of an object can be described by its position, direction of motion, and speed with respect to some other object.   + 7.P.1.2 Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity and magnets).   + 7.P.1.3 Illustrate the motion of an object using a graph to show a change in position over a period of time.   + 7.P.1.4 Interpret distance versus time graphs for constant speed and variable motion.   7.P.2 Understand forms of energy, energy transfer and transformation and conservation in mechanical systems.   * + 7.P.2.1 Explain how kinetic and potential energy contribute to the mechanical energy of an object.   + 7.P.2.2 Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).   + 7.P.2.3 Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.   + 7.P.2.4 Explain how simple machines such as inclined planes, pulleys, levers and wheel and axels are used to create mechanical advantage and increase efficiency. | | | |
| Essential Questions:   * How does balanced and unbalanced force affect motion? * How are mass and weight related? * How are mass, velocity, and momentum related? | | | |
| **Guiding Questions:**   1. How is speed calculated? 2. How are speed and acceleration related? 3. How are speed and velocity related? 4. How are forces measured? 5. What examples of pushing and pulling forces to do observe to change the position of an object? 6. How are potential and kinetic energy related? 7. What are some examples of inertia in our daily lives? 8. What are some examples of friction in our daily lives? 9. How do I use these materials to construct a go-cart that will travel 1 meter? 10. What are examples of simple machines to make work easier? 11. What are some of Isaac Newton’s contributions? 12. What is motion? 13. What is reference point? Why is important for describing motion? 14. What are the basic requirements for a distance versus time graph? 15. How can a graph be analyzed for the motion it represents? | | | |
| **Enduring Understandings:**   * There is a relationship between action and reaction. * Forces are pushes and pulls. * There is a relationship among mass, force and acceleration. * A vehicle can be designed using knowledge of force, motion, and technology. | | | |
| **I can statements:**   * **I can explain the importance of an object’s reference point.** * **I can calculate the speed, time, or distance of an object in motion.** * **I can compare and contrast speed and velocity.** * **I can compare and contrast balanced and unbalanced forces.** * **I can predict the change in motion an object will experience based on the force to be applied.** * **I can explain Newton’s Laws of Motion by using examples of everyday life.** * **I can determine an objects speed based on a distance time graph.** * **I can describe an objects change in motion from analyzing the information a distance/time graph** * **I can predict the amount of work an object will produce based on its potential mechanical energy.** * **I can create a diagram that shows how the conservation of energy applies to an object as potential energy and kinetic energy are transferred within a system.** * **I can explain the role of a loop in an electrical circuit.** * **I can create a graphic organizer that shows how electrical energy can be generated by wind, water, solar or fossil fuels.** * **I can explain energy loss in Law of Conservation of Energy.** * **I can calculate the amount of work done when an object is moved a given distance by a given force.** * **I can calculate the mechanical advantage of a simple machine.** * **I can evaluate which simple machine will allow me to gain the most efficiency based on its design.** * **I can design a compound machine using 3 or more simple machines** | | | |
| **Interdisciplinary Connections:**  Model Mathematics… Draw evidence from literary or informational texts to support research. | | | |
| **Evidence of Learning**   * Daily exit tickets (5 questions per day aligned with the Essential Standards) * Daily reflection on the lesson * Student Inquiry Activities/labs * Constructive Response Notebook * Formative and informative assessments | | | |
| **Summative Assessment:**   * MSLs * District Common Formative Assessment | | | |
| **Essential Vocabulary:**  Reference Point  Distance  Speed  Velocity  Average Speed  Constant Speed  Force  Balanced Force  Unbalanced Force  Applied Force  Mass  Friction  Oppose  Resist  Gravity  Magnetic  Inertia  Tendency  Positive Acceleration  Negative Acceleration  Input | Output  Directly Proportional  Indirectly Proportional  Slope  Energy  Work  Mechanical Energy  Potential Energy  Kinetic Energy  Transfer  Conservation  Thermal Transfer  Mechanical Transfer  Electrical Transfer  Electromagnetic Transfer  Battery  Generator  Circuit  Primary Source of  Electrical Energy  Secondary Source of  Electrical Energy | | Green Energy  Machine  Mechanical Advantage  Ideal Mechanical  Advantage (IMA)  Actual Mechanical  Advantage (AMA)  Efficiency  Lever  Pivot  Fulcrum  Fixed Load  Effort  Pulley  Wheel and Axle  Radius  Inclined Plane  Wedge  Screw  Threads  Compound Machines |
| **Assessment Tasks:**   * Summative unit assessment * Weekly vocabulary quizzes * Foldable — foldable of examples for each type of energy transfer (thermal, mechanical, electrical, and electromagnetic waves). * Demonstrations * Activities * Labs | | | |
| **Literacy and other Integration Opportunities/Resources:**   * New York Times articles on weather and air pollution * Possible unit novel — *Life as We Knew It* by Susan Beth Pfeffer (2006) * Social studies integration — Environmental Protection Agency and the organization’s social and industrial implications * Math integration * NCDPI - http://www.ncpublicschools.org/acre/standards/ * Learn NC - http://www.learnnc.org/ * GCS Science LiveBinder - http://www.livebinders.com/play/play\_or\_edit?id=178679 * GCS Secondary Science Google Site - https://sites.google.com/a/gaston.k12.nc.us/science/ | | | |

**7th Grade Science**

**Unit 2: Earth Systems, Structures and Processes**

**2015-16**

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| **Subject:** Science  **Grade Level/Course:** 7th grade  **Unit Title:** Earth Systems, Structures and Processes | **Timeframe Needed for Completion:** |
| **Big Idea/Theme:** How’s the weather up there?  **Learning Targets:**   * Students will understand that water constantly cycles through Earth and is thus never created nor destroyed. * Students will understand that meteorologists can predict the weather through a series of technological processes that collect data. * Students will understand that humans play a pivotal role in the health of our atmosphere. | |
| **Curriculum Goals/Objectives:**   * **7.E.1:** Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth’s atmosphere, weather and climate and the effects of the atmosphere on humans.   + **7.E.1.1:** Compare the composition, properties and structure of Earth’s atmosphere to include: mixtures of gases and differences in temperature and pressure within layers.   + **7.E.1.1:** Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth.   + **7.E.1.3:** Explain the relationship between the movement of air masses, high and low pressure systems and frontal boundaries to storms (including thunderstorms, hurricanes and tornadoes) and other weather conditions that may result.   + **7.E.1.4:** Predict weather conditions and patterns based on information obtained from:     - Weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity and air pressure)     - Weather maps, satellites and radar     - Cloud shapes and types and associated elevation   + **7.E.1.5:** Explain the influence of convection, global winds and the jet stream on weather and climatic conditions   + **7.E.1.6:** Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality and stewardship. | |
| **Essential Questions:**   * Explain how you could brush your teeth with the same water Abraham Lincoln took a bath in. * If you were to create a disaster emergency kit geared toward either a hurricane or a tornado, which would you create? Why? * What do you think will happen if we do not take steps to preserve and protect our air quality? | |
| **Guiding Questions:**   * What do you think air is made of? * What is the composition of air? * Is ozone good or bad for you, or both? * What essential gases make up the atmosphere? * What are the characteristics of each layer of the atmosphere? * What are the point sources air pollution? * What are and non-point sources of pollution? * How does weather affect our daily lives? * How is weather predictable? * What are the various ways we study weather? * How is air quality monitored and measured? * How is air quality communicated to the public? * How do humans impact air quality? * What are some ways to reduce air pollution? * What are the financial and economic trade-offs affecting air quality? * How does technology help us better predict weather conditions? * How do humans impact the atmosphere and natural resources? * Why is it necessary to study, collect data, and communicate information about the atmosphere? * What evidence do we have that supports the concept of global warming? * How do people effect the climate? * How does the ozone quality affect our daily lives? * What is the difference between weather and climate? | |
| **Enduring Understandings:**   * The atmosphere is composed of two major gases, nitrogen and oxygen. * Without atmosphere life as we know it on Earth would not exist. * Atmosphere is composed of the following layer: troposphere, stratosphere, mesosphere, and thermosphere. * The ozone layer that occurs naturally in the stratosphere abosrbes much of the harmful radiation from the sun, and CFC’s (chorofluoro carbons) are chemicals that can destroy portions of the ozone | |
| **I can statements:**   * use a science notebook to ask questions, record and label my data on tables and graphs * use data to make predictions and explain relationships * predict future weather conditions based on previously found data | |
| **Interdisciplinary Connections:** Math – measurement, graphing, percent’s, averages. Drawing information from literary and informational texts to support learning and research**.** | |
| **Evidence of learning/formative assessment:**   * Daily reflection on the lesson * Student Inquiry Activities/labs * Constructive Response Notebook * Formative and informative assessments | |
| **Summative Assessment:**   * MSLs * District Common Formative Assessment | |
| **Essential Vocabulary:**  Matter, Molecule, Density, Equilibrium, Atmosphere, Troposphere, Stratosphere, Mesosphere, Thermosphere, Exosphere, Weather, Climate, Equator, Poles, Uneven heating, Precipitation, Respiration, Photosynthesis, Water cycle, Evaporation, Condensation, Rivers, Lakes, Soil, Porous rock, Ocean, Sunlight, Continents, Runoff, Groundwater, Transpiration, Saltwater, Freshwater, Meteorologist, Weathering, Decay, Organic matter, Wind, Nitrogen, Oxygen, Argon, Carbon dioxide, Trace gases, Water vapor, Composition, properties, Gases, Temperature, Pressure, Mercury, barometer, Aneroid barometer, Air masses, Cold front, Warm front, Occluded front, Stationary front, Ice caps, High pressure system, Low pressure system, Frontal boundary, Thunderstorm, Lightning, Hurricane, Intense, Flood, Storm surge, Tornado, Spiral, Winter storm, Accumulation, Blizzard, Dust storm, Direct observation, Measurement, Wind speed, Wind direction, Humidity, Relative humidity, Air pressure, Weather maps, Satellites, Radar, Cloud, Cumulus cloud, Cirrus cloud, Stratus cloud, Thunderhead, Cumulonimbus, Elevation, Altitude, Convection currents, Global winds, Jet stream, Weather forecasting, Cloud cover, Long range weather forecasting, Short range weather predictions, Satellite images, Thermal energy, Ocean currents, Moderate temperature, Latitude, Longitude, Solar energy, Land breeze , Sea breeze, Pressure gradient, Pressure-gradient force, Coriolis effect, Earth’s axis, Cyclone,  Gulf Stream, Surface current, Fog, Atmospheric storms, Air quality, Stewardship, Ozone depletion, Global, Human health risks, Particulate matter, Acid rain, Global warming, Global community, Fossil fuels, Carbon dioxide, Smog,  Colloid, Smoke, Chemicals, Forest fires, Volcanic eruptions, Plant pollen, Prevailing winds, Environmental Protection, Agency (EPA), Natural pollutant, Man-made pollutant, Radon, Mold spores, Plowed fields dust | |
| **Assessment Tasks:**   * Summative unit assessment * Weekly vocabulary quizzes * Foldable — Layers of the Atmosphere * Demonstration — The Coriolis Effect (with a flour-dusted globe and food coloring) * Activity — RAFT * Activity — Act out an air pollution script and answer reading comprehension questions * Activity — Ride the Water Cycle * Lab — Water cycle simulation * Activity — Air Masses Four Corners | |
| **Literacy and other Integration Opportunities/Resources:**   * New York Times articles on weather and air pollution * Possible unit novel — *Life as We Knew It* by Susan Beth Pfeffer (2006) * Social studies integration — Environmental Protection Agency and the organization’s social and industrial implications * Math integration * NCDPI - http://www.ncpublicschools.org/acre/standards/ * Learn NC - http://www.learnnc.org/ * GCS Science LiveBinder - http://www.livebinders.com/play/play\_or\_edit?id=178679 * GCS Secondary Science Google Site - https://sites.google.com/a/gaston.k12.nc.us/science/ | |

**7th Grade Science**

**Unit 3: Living Organisms**

**2015-16**

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| **Subject:** Science  **Grade Level/Course:** 7th grade  **Unit Title:** Living Organisms | **Timeframe Needed for Completion:** |
| **Big Idea/Theme:**  **Learning Targets:**   * Distinguish the unique characteristics of each of the following organisms: Euglena, Amoeba, Paramecium and Volvox * List the method of motility, and process of acquiring food for Euglena, Amoeba, and Paramecium and Volvox * Create a chart that compares and contrasts Euglena, Amoeba, Paramecium and Volvox * Identify and label the organelles of a plant and an animal cell and their functions. * Identify which organelles belong to Prokaryotic and Eukaryotic cells. * Compare and contrast organelles that belong to plant and animal cells. * Describe the functions of organelles using key vocabulary to a peer. * Create a graphic organizer that describes the hierarchy from cell to organism in order of complexity. * Identify the major systems of the human body. * Identify the parts of each body system. * Explain the function of each of the major systems of the human body. * Understand that the major body systems are inter-connected and be able to give examples of this interconnectedness. * Explain how the body strives to maintain homeostasis. | |
| **Curriculum Goals/Objectives:**  **7.L.1** Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life.   * **7.L.1.1** Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including:   + Euglena   + Amoeba   + Paramecium   + Volvox * **7.L.1.2** Compare the structures and functions of plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, chloroplasts, mitochondria, and vacuoles). * **7.L.1.3** Summarize the hierarchical organization of multi-cellular organisms from cells to tissues to organs to systems to organisms. * **7.L.1.4** Summarize the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, and excretion) and ways that these systems interact with each other to sustain life. | |
| **Essential Questions:**   * What are the basic organelles of a plant cell? Of an animal cell? * What are the basic organelles of a Prokaryotic and a Eukaryotic cell? * How are plant and animal cells alike? How are they different? * What are the functions of the plant and animal cell organelles? * Identify and label the organelles of a plant and an animal cell and their functions. * Identify which organelles belong to Prokaryotic and Eukaryotic cells. * Compare and contrast organelles that belong to plant and animal cells. * Describe the functions of organelles using key vocabulary to a peer. * Identify the major systems of the human body. * Identify the parts of each body system. * Explain the function of each of the major systems of the human body. * Understand that the major body systems are inter-connected and be able to give examples of this interconnectedness. * Explain how the body strives to maintain homeostasis. | |
| ***Knowledge Targets:***   * Cells are the basic unit of life, which carries out the following functions: extract energy from food, get rid of waste, move, reproduce and detect the environment they are in. * Euglena, amoeba, paramecium and volvox are all protists. * Euglena move by flagellum. They also have an eye spot. They are common in freshwater and can contain chlorophyll. * Amoebas move by cytoplasmic streaming and use their pseudopods to engulf its food. * Paramecium move by cilia. * Volvox live in colonies and can contain chlorophyll. * All living things are made of cells, whether they are unicellular or multicellular. * Cells are microscopic. * Cells are made up of organelles/parts. Each organelle/part has its own specific function. * There are organelles and parts of the cell that are common in both animal and plant cells: cell membrane, cytoplasm, nucleus, nuclear membrane, mitochondria, and vacuole. * Organelles found only in plant cells are cell wall and chloroplasts. * The cell membrane is the outer boundary of the cell and only allows certain materials in and out of the cell. * Cytoplasm is a gel like material that contains water and nutrients for the cell. * Nucleus directs the activity of the cell. It also contains chromosomes with DNA. * Mitochondria break down food and provide energy to the cell. * Vaculoes are storage areas for the cell. * Cell wall provides structure to plant cells. * Chloroplasts contain chlorophyll that makes food for the plant cell. * Cells are specialized to perform specific functions in multicellular organisms. * Cells that work together form tissues. * Tissues that work together form organs. * Organs that work together form organ systems. * Organ systems that work together form organisms. * An animal must perform certain functions to survive. Cells, tissues, organs, and organ systems work together to accomplish these tasks. * In order to get rid of waste an organism uses its respiratory, digestive and urinary systems. * In order to gain energy an organism uses its respiratory and digestive systems. * For support and movement an organism uses its skeletal and muscular system. * An organism will use its circulatory, respiratory, digestive and urinary systems to move nutrients to locations where it is needed and waste out of the body. * The reproductive system is used by the organism to make more of its kind. * The immune system protects the body from foreign bodies. * The nervous system controls all of the organism’s functions. * The endocrine system uses hormones to regulate many of the organism’s bodily processes including balance (homeostasis). | |
| **Enduring Understandings:**   * Determine how cells carry out the major functions of life. * Conclude that protists are the most diverse kingdom of life. * Determine that cells are the smallest and most basic unit of life (living things). * Conclude that devices such as microscopes must be used in order to see a cell. * Determine that multicellular organisms are more complex than unicellular organisms. * Identify the parts of an animal cell. * Identify the parts of a plant cell. * Compare plant and animal cells. * Conclude that photosynthesis takes place in the chloroplasts. * Conclude that respiration takes place in the mitochondria. * Conclude that the nucleus contains the genetic information of the cell. * Conclude that the cell membrane aids in controlling the environment inside the cell. * Determine that cells must become specialized in order to perform the different functions an organism needs to do to survive. * Conclude that tissues and organ systems in animals are similar to those in humans but differ from those found in plants. * Cells become differentiated and specialized when an organism develops from a fertilized egg to an embryo. * Determine the levels of organization of living things. * Determine that cellular respiration requires oxygen and will release carbon dioxide as a waste product. * Conclude that organ systems work together in order to control the inner environment of an organism. * Identify the functions of different organ systems. * Assess how human health is affected when homeostasis is not achieved. | |
| **I can statements:**   * **I can evaluate why the needs of all living things has been narrowed down to the list provided.** * **I can identify differences in the needs of various living things.** * **I can explain how the advancement of the microscope led to the development of the cell theory.** * **I can identify the major organelles of the single celled organism (nucleus, cell membrane, mitochondria, and ribosomes) and the role they play in meeting the survival needs of the organism.** * **I can compare and contrast a plant and animal cell by creating a chart and assess why the cells have different needs.** * **I can distinguish the type of movement a single-celled organism would exhibit based on its structures.** | |
| **Activating Strategy:**   * Discovery Education—“Protist Reading Passage” | |
| **Evidence of learning:**   * Daily reflection on the lesson * Student Inquiry Activities/labs * Constructive Response Notebook * Formative and informative assessments | |
| **Summative Assessment:**   * MSLs * District Common Formative Assessment | |
| **Essential Vocabulary:**   * **7.L.1.1:** Cells, Euglena, flagellum, eye spot, chlorophyll, amoeba, cytoplasmic streaming, pseudopods, paramecium, protists, cilia (ciliates), volvox, * **7.L.1.2:** microscope, cell membrane, cytoplasm, nucleus, nuclear membrane, mitochondria, vacuoles, cell wall, chloroplasts, * **7.L.1.3:** tissues, organ, organ systems, organisms, * **7.L.1.4:** oxygen, carbon dioxide, lungs, urinary system, intestinal tract, respiratory system, circulatory system, skeletal system, muscular system, reproductive system, immune system, nervous system, endocrine system, homeostasis | |
| **Assessment Tasks:**   * Summative unit assessment * Weekly vocabulary quizzes * Foldable * Demonstrations * Activities * Lab | |
| **Literacy and other Integration Opportunities/Resources:**   * New York Times articles on weather and air pollution * Possible unit novel — *Life as We Knew It* by Susan Beth Pfeffer (2006) * Social studies integration — Environmental Protection Agency and the organization’s social and industrial implications * Math integration * NCDPI - http://www.ncpublicschools.org/acre/standards/ * Learn NC - http://www.learnnc.org/ * GCS Science LiveBinder - http://www.livebinders.com/play/play\_or\_edit?id=178679 * GCS Secondary Science Google Site - https://sites.google.com/a/gaston.k12.nc.us/science/ | |

**7th Grade Science**

**Unit 4: Evolution and Genetics**

**2015-16**

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| **Subject:** Science  **Grade Level/Course:** 7th grade  **Unit Title:** Evolution and Genetics | **Timeframe Needed for Completion:** |
| **Big Idea/Theme:**  **Learning Targets:**   * Trace the steps of mitosis and meiosis and describe the outcome of each. * Compare and contrast mitosis and meiosis. * Compare and contrast sexual and asexual reproduction and tell the benefits of both to the individual organism. * Discuss the importance of DNA to the cell. * Compare and contrast genotype and phenotype. * Describe the significance of homozygous and heterozygous phenotypes and genotypes. * Interpret the information in a pedigree and trace the genetic traits through the family. * Predict how traits will pass on through an organism using a Punnett square. * Explain the importance of the environment and lifestyle choices on biological inheritance (to include common genetic diseases) and survival. | |
| **Curriculum Goals/Objectives:**  **7.L.2** Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring.   * **7.L.2.1** Explain why offspring that result from sexual reproduction (fertilization and meiosis) have greater variation than offspring that result from asexual reproduction (budding and mitosis). * **7.L.2.2** Infer patterns of heredity using information from Punnett squares and pedigree analysis. * **7.L.2.3** Explain the impact of the environment and lifestyle choices on biological inheritance (to include common genetic diseases) and survival. * **7.L.2.1:** Genes, sexual reproduction, asexual reproduction, budding, mitosis, daughter cell, chromosomes, meiosis, offspring, cell division, gametes, fertilization, genetics, inheritance, DNA, protein, cell cycle, traits, dominant trait, recessive trait, sex-linked trait, phenotype, genotype, selective breeding, sperm, egg * **7.L.2.2:** pedigree, genetic disease, Punnet square, purebred, hybrid, homozygous, heterozygous, co-dominance * **7.L.2.3:** species, natural selection, genetic disease | |
| **Essential Questions:**   * What is mitosis? * What are the steps of mitosis? * What is meiosis? What are the steps of meiosis? * How are mitosis and meiosis alike and different? * How are sexual and asexual reproductions alike and different? * What is DNA? Where is it located? * What is the importance of DNA? * What is a genotype and a phenotype? * What is a Punnett Square? * How is a Punnett Square used to predict the traits of off-spring in a family? * How do environmental factors affect biological inheritance? * How do life style choices affect biological inheritance? | |
| ***Knowledge Targets:***   * Organisms can either reproduce sexually or asexually. * In asexual reproduction all the genes come from a single parent. * Budding is a type an asexual reproduction in which a cell or group of cells pinch off to form a new organism. * Mitosis is a type of asexual reproduction where a cell divides to form two new daughter cells, each with the same genetic information as the parent cell. * Most sexual reproduction requires there to be two sexes, with half of the genes coming from each parent. * Fertilization is a type of sexual reproduction where the sperm and egg fuse together. * Sperm and egg are formed during meiosis. * Meiosis is a different kind of cell division where gametes are produced containing half the number of chromosomes as a parent’s body cell. * Genes are segments of DNA that control protein production and the cell cycle. * Chromosomes carry the genetic material (DNA). * Traits are characteristics that are inherited from generation to generations * Dominant traits mask the recessive trait and are observable. * Phenotype is how an organism looks and behaves. * Genotype is the genetic combination of an organism. * Selective breeding has been used by humans to make sure certain traits are passed down and enhanced from generation to generation, most notably in agriculture. * A pedigree is a diagram of family relationships that uses symbols to represent people and lines to represent genetic relationships. * Pedigrees are often used to determine whether or not a genetic disease is dominant or recessive. * A Punnet Square is a chart where all possible genetic combinations are shown in the cross of parents. * Organisms that are better fit to their environments are more likely to survive and pass their traits to their offspring (natural selection). * Changes in the environment can affect the survival of an organism and/or species. * Traits can be either inherited or can be a result from interactions with the environment and life style choices. * Some genetic diseases appear only when an individual has inherited a certain faulty gene from both parents. * Sanitation, diet, medical care, sex, genes, environmental conditions, and personal health behaviors influence the length and quality of human life. | |
| **Enduring Understandings:**   * Compare sexual and asexual reproduction. * Compare mitosis and meiosis. * Determine that traits of organisms are carried in their genes. * Summarize the steps of the cell cycle (to include mitosis and meiosis). * Compare genotype and phenotype. * Conclude that the genotype determines the phenotype (DNA -> RNA -> Protein). * Determine that sexual reproduction leads to more genetic variation in offspring than asexual reproduction. * Determine that recognizing the patterns of inheritance can lead people to select for certain traits that would be more beneficial. * Conclude that pedigrees and Punnet Squares can be used to assess the genetic information of parents and offspring. * Assess how the environment can influence what traits are passed on from generation to generation. * Determine how an organism’s fitness can lead to certain traits being passed on to different generations. * Determine how an organism can carry a gene for a genetic disease but not be affected by the disease. * Assess how the quality and length of life have changed due to advances in health and sanitation. * Assess how environmental and personal health choices can be beneficial or harmful to a person’s length and quality of life. | |
| **I can statements:**   * **I can explain why it is important for DNA to replicate before normal mitosis can occur.** * **I can sequence the steps of mitosis.** * **I can explain how cancer can relate to mitosis.** * **I can sketch the stages of meiosis.** * **I can put the steps of meiosis and fertilization in order.** * **I can explain the relationship between correct meiosis and genetic disorders.** * **I can use a Punnett square to predict the likelihood of 2 heterozygous tall pea plants producing a short plant.** * **I can analyze a pedigree to determine the genotype and phenotype of different people in a family.** * **I can identify the pros and cons in scientists using selective breeding and provide examples of scientists using selective breeding to improve human life.** * **I can predict the possible outcome of two heterozygous CF carriers producing offspring that have CF and/or are carriers for the disease.** * **I can provide examples of ways the environment can change the characteristics of an organism.** * **I can explain how lifestyle choices could affect the possibility of genetic diseases and survival, such as smoking and lung cancer.** * **I can create a graphic organizer that shows the** **levels of organization of a multi-cellular organism.** | |
| **Activating Strategy:**   * Weblabs * Gizmo- www.explorelearning.com * www.2edc.org * Jog the Web- Genetics- [www.jogtheweb.com./run/qGjY3QdPChJv/Genetics](http://www.jogtheweb.com./run/qGjY3QdPChJv/Genetics) * My Heritage- <http://www.myheritage.com/> * [www.sciencespot.net-](http://www.sciencespot.net-) Mitosis Flip book | |
| **Evidence of learning:**   * Daily reflection on the lesson * Student Inquiry Activities/labs * Constructive Response Notebook * Formative and informative assessments | |
| **Summative Assessment:**   * MSLs * District Common Formative Assessment | |
| **Essential Vocabulary:**   * **7.L.2.1:** Genes, sexual reproduction, asexual reproduction, budding, mitosis, daughter cell, chromosomes, meiosis, offspring, cell division, gametes, fertilization, genetics, inheritance, DNA, protein, cell cycle, traits, dominant trait, recessive trait, sex-linked trait, phenotype, genotype, selective breeding, sperm, egg * **7.L.2.2:** pedigree, genetic disease, Punnet square, purebred, hybrid, homozygous, heterozygous, co-dominance * **7.L.2.3:** species, natural selection, genetic disease | |
| **Assessment Tasks:**   * Summative unit assessment * Weekly vocabulary quizzes * Foldable * Demonstrations * Activities * Lab | |
| **Literacy and other Integration Opportunities/Resources:**   * New York Times articles on weather and air pollution * Possible unit novel — *Life as We Knew It* by Susan Beth Pfeffer (2006) * Social studies integration — Environmental Protection Agency and the organization’s social and industrial implications * Math integration * NCDPI - http://www.ncpublicschools.org/acre/standards/ * Learn NC - http://www.learnnc.org/ * GCS Science LiveBinder - http://www.livebinders.com/play/play\_or\_edit?id=178679 * GCS Secondary Science Google Site - https://sites.google.com/a/gaston.k12.nc.us/science/ | |